Technical Memorandum

To:	Kurt Batsel, Dextra Group
From:	Tom Wright, GES Project Manager
cc:	Jennifer Clay, GES Holly Holbrook, AECOM
Date:	May 21, 2021
Re:	TRW Microwave Site (Site), Sunnyvale, California: Annual Maintenance Inspection: Sub-Slab Depressurization (SSD) System

Groundwater Environmental Services, Inc. (GES) on behalf of Northrop Grumman, has prepared this technical memorandum (memo) for the 2020 Annual Maintenance Inspection: Sub-Slab Depressurization (SSD) System for the former TRW Microwave Site (Site) in Sunnyvale, California (**Attachment A**). The United States Environmental Protection Agency (USEPA) is the lead regulatory agency for the Site, after regulatory oversight transferred from the California Regional Water Quality Control Board – San Francisco Bay Region on August 7, 2014 (USEPA, 2014). This memo has been prepared to address a recommendation in the 2019 Five Year Review Report (USACE, 2019) to incorporate "long-term stewardship measures for the current vapor mitigation measures in place." This memo provides a summary of the first annual visual inspection of the SSD system in place and observations made during the site visit conducted on November 12, 2020.

SSD Background

The passive SSD System was initially installed in August and September of 2014 as a proactive measure before renovation of the building. The purpose of the SSD was to mitigate potential vapor intrusion due to sub-slab concentrations of volatile organic compounds (VOCs). The sub-slab concentrations of VOCs were identified during a vapor intrusion assessment conducted in 2014 and reported in the Passive Sub-Slab Vapor Collection System Installation Work Plan (AECOM, 2014).

The major components of the SSD system consists of a series of permeable lateral vents (a combination of slotted polyvinyl chloride pipe and GeoVent™ Trenchless Gas Collection system) installed beneath the concrete slab for vapor collection, which are then connected to vertical risers that vent to the roof of the building via wind-powered roof turbines on each section of the building. The current vent layout is shown on **Attachment A**. A detailed description of the SSD system is documented in the Passive Sub-Slab Vapor Collection System Installation Work Plan (AECOM, 2014).

Between May 2015 and December 2015, the building conditions changed due to construction for the building tenant, Apple, Inc. (AECOM, 2016). Changes to the building included the installation of additional heating, ventilating, and air conditioning (HVAC) equipment on all three building roofs and the installation of barriers along the perimeter of the building roofs. In order to complete this work, modifications were made to the wind-powered roof turbines in each section of the building. The modifications included reducing the height of the roof turbine risers in some locations to install equipment over the top of the roof turbines.

In December 2015, AECOM performed an additional building survey and conducted vapor intrusion (VI) sampling to assess whether the VI risk had changed due to the tenant improvements. The survey included collection of three sub-slab samples, collection of nine indoor air samples, and collection of one outdoor ambient air sample, and concluded that, chemicals detected in indoor air do not pose a human health risk to current building occupants. The survey conclusion was based on the current building conditions, which included the building modifications completed for Apple (AECOM, 2016).

SSD Visual Inspection

GES conducted a visual inspection of the SSD during a site visit on November 12, 2020. Access was granted by the current tenant Apple, Inc. The SSD system was visually documented to assess the system for its current working state. Observations were made regarding current building roof layout of HVAC systems, barriers, and roof equipment. Each of the three buildings associated with the site have a cluster of two to three vent risers that extend from the sub-slab collection laterals and penetrate the roof to allow for passive depressurization of the sub-slab area. Each vent riser is equipped with a wind-powered roof turbine, and during the site visit observations were made to assess if the turbines were freely turning and free of corrosion, were actively turning due to wind, and their current location relative to existing roof equipment. A comparison photo log is in included as **Attachment A**.

SSD Observations

During the annual maintenance inspection of the SSD system, the following visual observations were noted:

- Wind barriers are still in place on all three buildings;
- The vent risers on the main building (**Attachment A**) are currently approximately 1-foot tall, the installed height was approximately 3-feet; and
- All roof turbines spin freely with manual assistance and do not appear to be seized due to corrosion or rust. During the site visit, only the roof turbines on the north building were observed to be spinning due to ambient wind.

Conclusions

The current configuration of the SSD system is consistent as configured during the December 2015 sampling and VI assessment (AECOM, 2016), and roof turbines are in working condition.

Recommendations

The roof turbines of the SSD system should be inspected during the 2021 sampling event tentatively scheduled to be conducted in fourth quarter 2021.

References

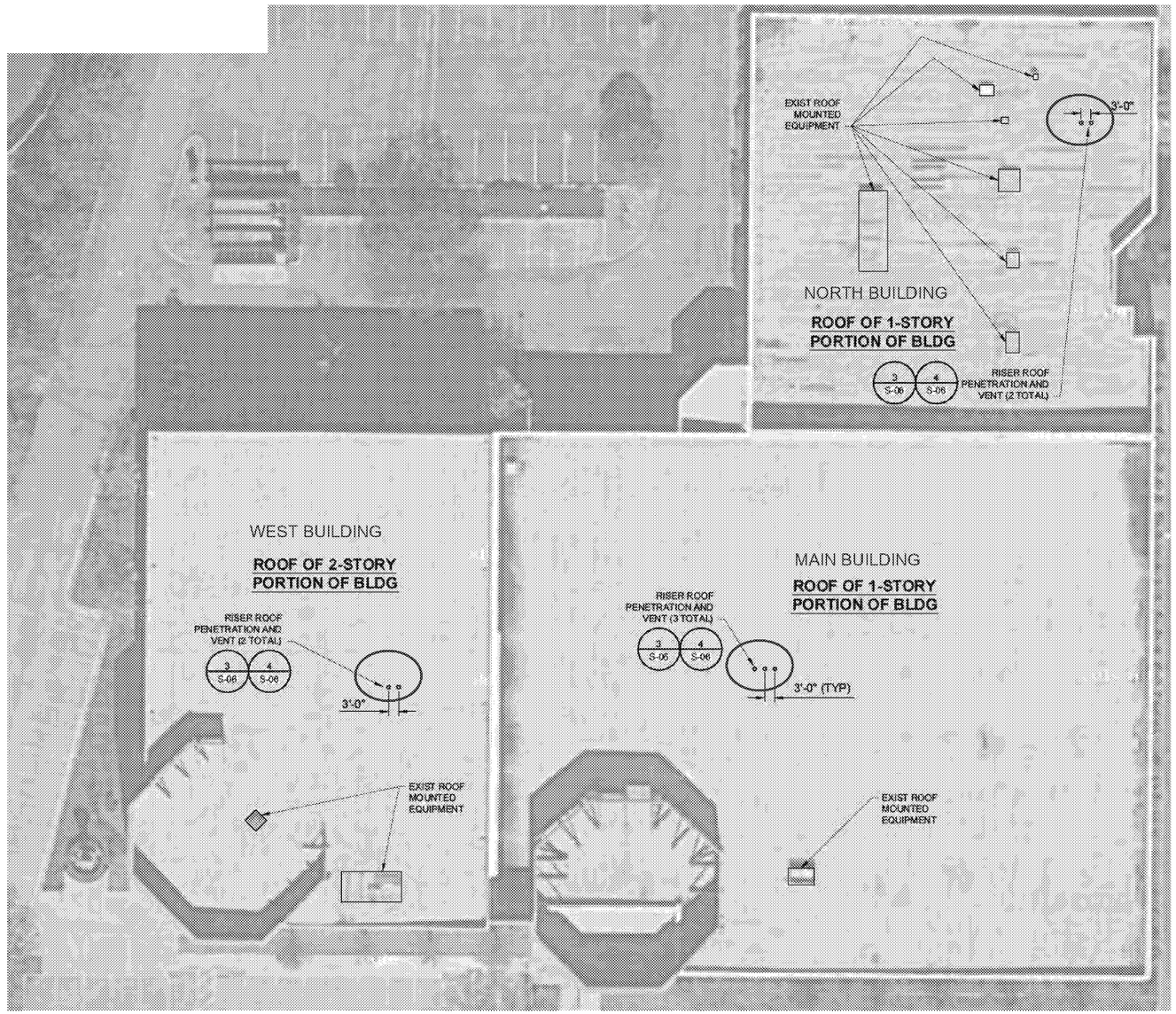
AECOM, 2014. Passive Sub-Slab Vapor Collection System Installation Work Plan, Former TRW Microwave Facility, 825 Stewart Drive, Sunnyvale, California. August 13.

AECOM, 2016. Vapor Intrusion Evaluation Report, Former TRW Microwave Site, 825 Stewart Drive, Sunnyvale, California. February.

USACE, 2019. Fifth Five-Year Review Report for Advanced Micro Devices 901/902 and TRW Microwave Superfund Sites, Includes the Companies' Offsite Operable Unit, Santa Clara County, California. Prepared for USEPA. September 18.

USEPA, 2014. Notice of Lead Agency Transfer – California Regional Board to US EPA Triple Site: AMD 901/902 Thompson Place Superfund Site, Philips (formerly Signetics) Site, and TRW Microwave Superfund Site and Offsite Operable Unit, Sunnyvale, California.

Attachment A



ROOF PLAN
Scale: 1" = 20'-0"
0 20' 40'

GENERAL NOTES:

1. BUILDING PLANS ARE TAKEN FROM RECORD DOCUMENTS AND MAY NOT REFLECT EXISTING CONDITIONS. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO ANY EXCAVATION.

RED CIRCLES INDICATE LOCATION OF ROOF RISERS AND VENTS IN 2014

AECOM

PROJECT
Passive Sub-slab Vapor Collection System
Former TRW Microwave Facility
Sunnyvale, CA

CLIENT
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Falls Church, VA

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REGISTRATION

August 1, 2014

ISSUE/REVISION

I/R	DATE	DESCRIPTION
1	AUG 2014	ISSUE FOR CONSTRUCTION

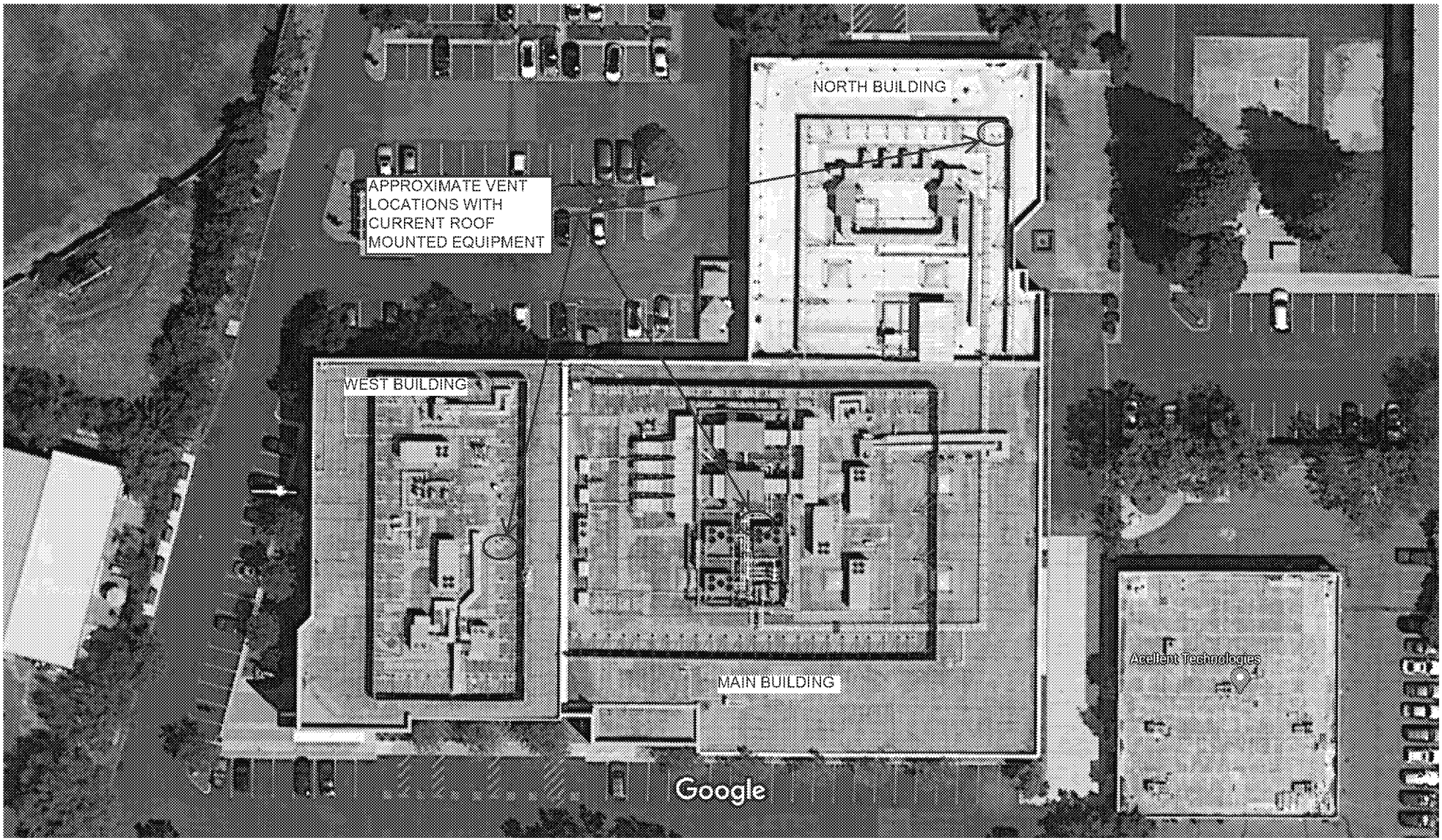
PROJECT NUMBER
60238860

SHEET TITLE
BUILDING ROOF PLAN

DWG NUMBER	SHEET NUMBER
S-02	4 of 8

Google Maps

APPROXIMATE CURRENT ROOF MOUNTED EQUIPMENT AS OF 10/12/2020



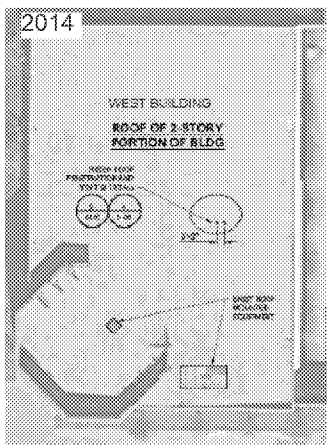
Imagery ©2020 Maxar Technologies, Map data ©2020 20 ft

WEST BUILDING VENTS - 2014 INSTALLATION (VIEW SOUTHWEST)

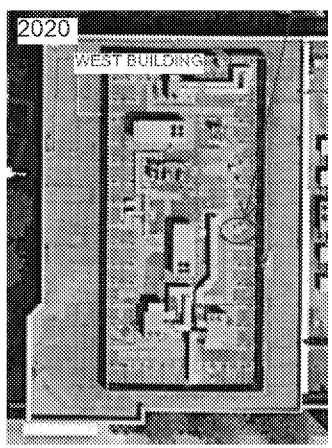
WEST BUILDING VENTS - 10/12/2020 INSPECTION (VIEW SOUTH)

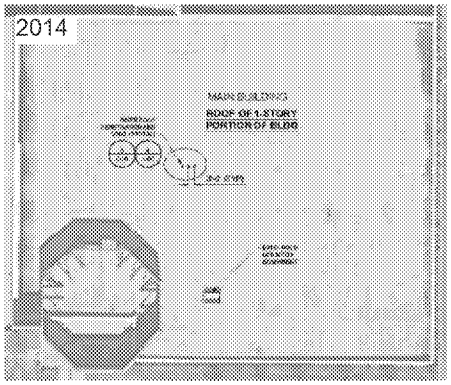
WEST BUILDING VENTS - 10/12/2020 INSPECTION (VIEW NORTH)

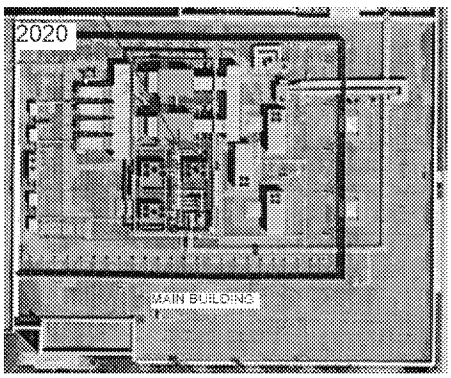
2014



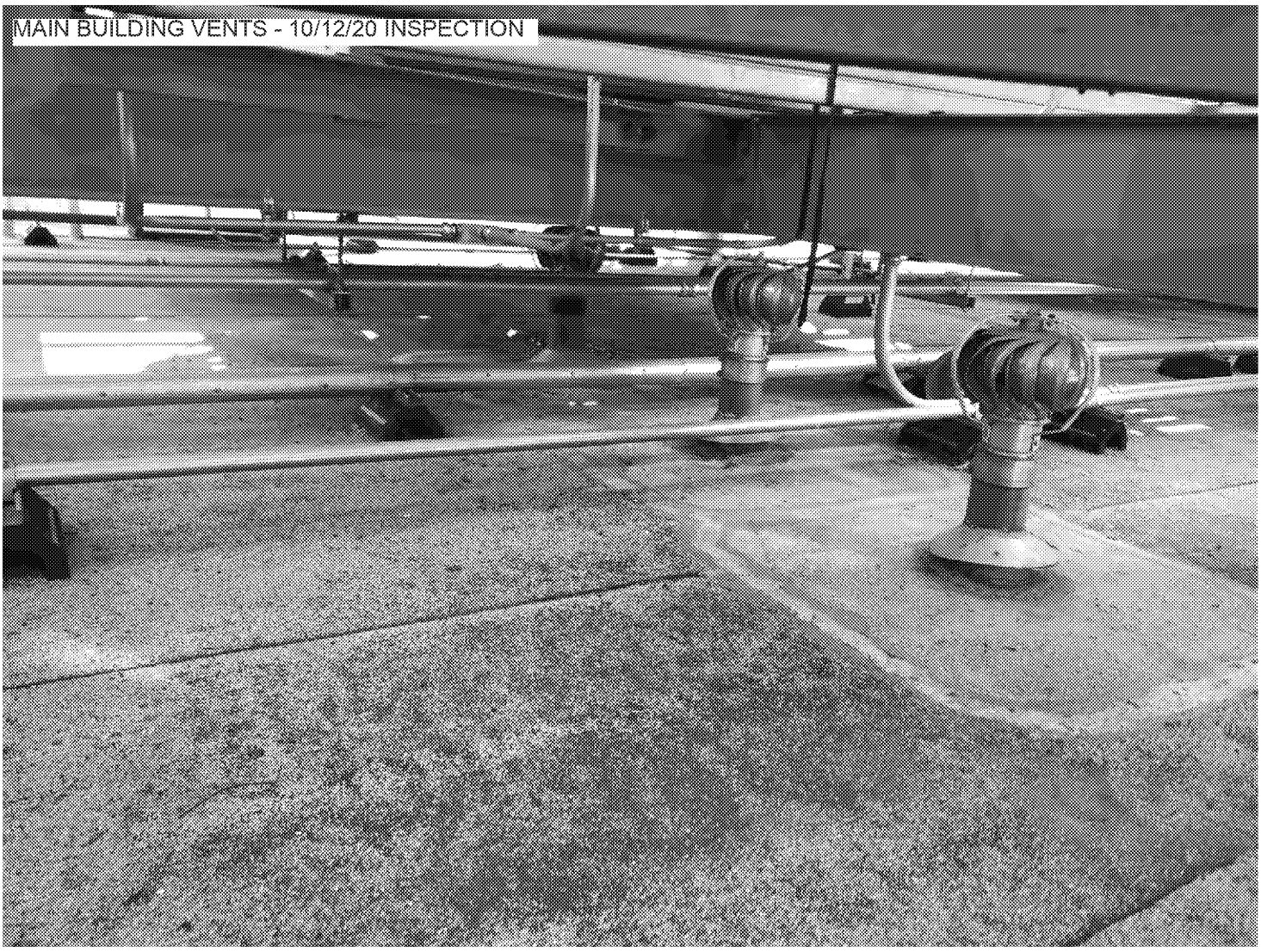
2020



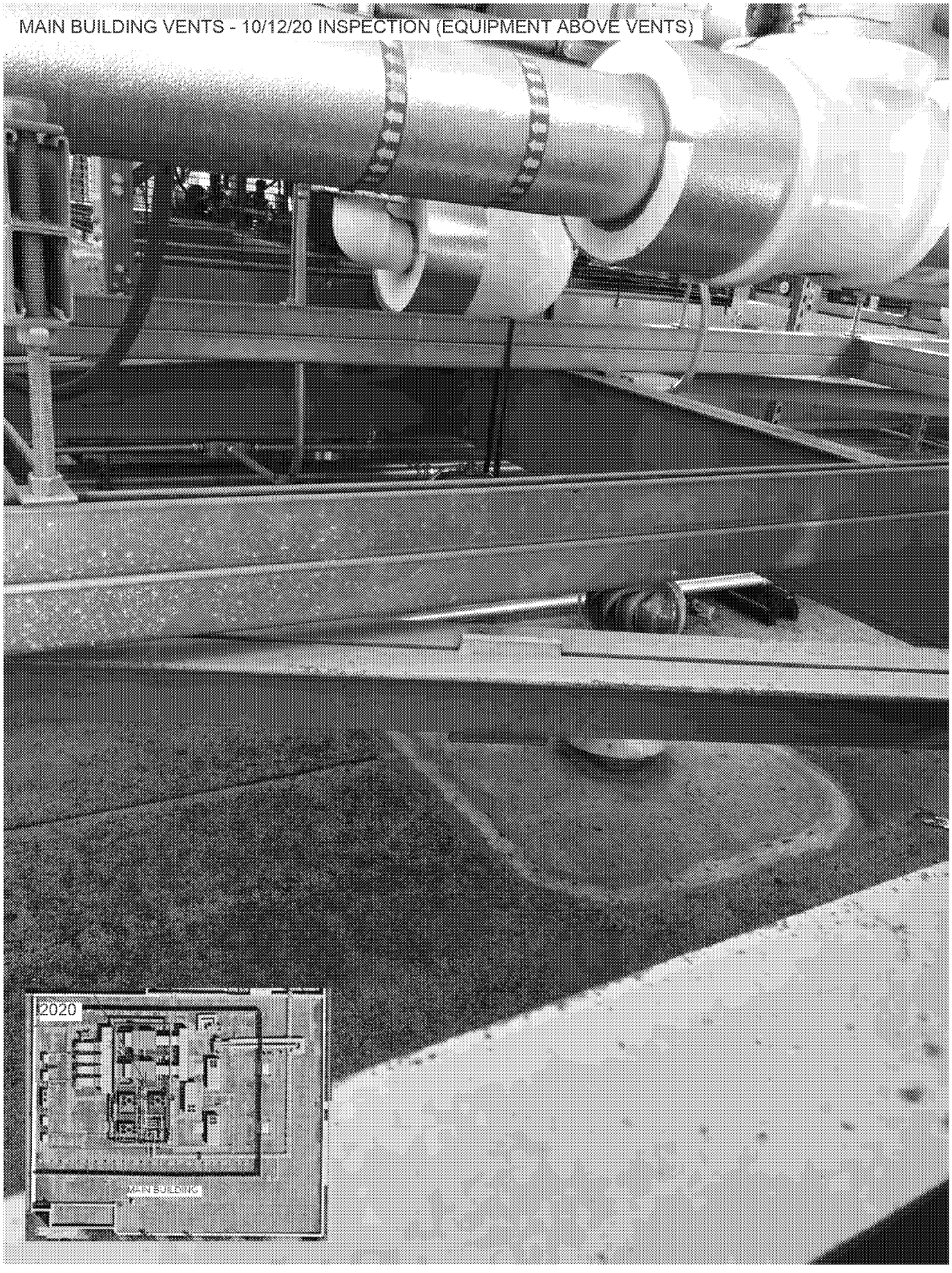

2014
MAIN BUILDING
ROOF OF 1-STORY
PORTION OF BLDG


2020
MAIN BUILDING

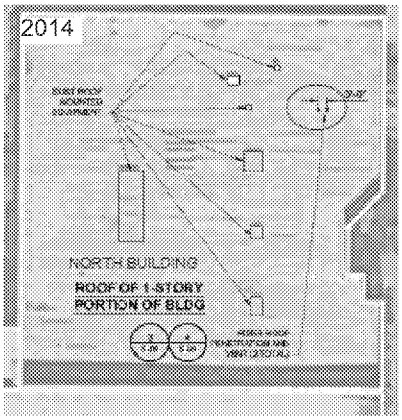

MAIN BUILDING VENTS - 2014 INSTALLATION


MAIN BUILDING VENTS - 10/12/20 INSPECTION

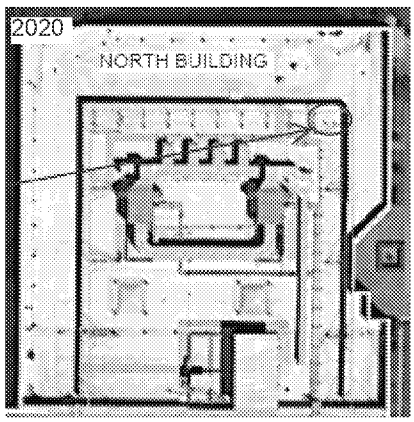
MAIN BUILDING VENTS - 10/12/20 INSPECTION (EQUIPMENT ABOVE VENTS)



2014



2020



NORTH BUILDING VENTS - 10/12/2020 INSPECTION (VIEW NORTHEAST)

NORTH BUILDING VENTS - 10/12/2020 INSPECTION (VIEW SOUTH)